

MASTER IN PHOTONICS – PHOTONICS BCN EUROPHOTONICS-POESII MASTER COURSE

PROPOSAL FOR A MASTER THESIS

Dates: April - September 2017

Laboratory : Nonlinear Optical Phenomena
Institution: ICFO
City, Country : Castelldefels, Barcelona

Title of the master thesis: Analysis of anisotropic planar structures.

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Summary of the subject (maximum 1 page):

Anisotropic media, although being a classical subject in optics, present a number of interesting phenomena, such as Conical refraction and Dyakonov surface waves, that still now a days require a deeper and generalized study. Specifically, planar structures of multiple layers of anisotropic crystals with arbitrary orientation of the optical axis may present interesting applications in the fields of LCD screens and optical communication components. However, such systems have never been analysed up to now. The main reason for that was the lack of a technology capable to fabricate such structures. However, a variety of techniques and materials, mainly based on liquid crystals and liquid crystal polymers are now available for visible and near-infrared wavelength, opening the door to their fabrication.

The objective of this master thesis is to develop a semi-analytical method capable to find any kind of guided and leaky modes in an anisotropic, multilayer structure with arbitrary orientation of the optical axis.

Keywords: Anisotropy, birefringence, Dyakonov surface waves, hybrid modes, leaky modes

Additional information:

* Required skills: Strong mathematical and electromagnetic background, knowledge on Python programming.

* Miscellaneous: Full time dedication.